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BEAVERS AND THEIR WAYS.*

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IT is always unwise to attempt to generalise from insufficient data, as it is to draw conclusions solely from personal experience. It is only from a study of the united testimony of competent observers that we can hope or expect to arrive at the truth; and this holds good not only of Zoology, but, it may be said, of all human affairs. Hence we should by no means neglect to peruse what has been written by the ancients, as well as by the best modern authorities, on any subject that we may take up.

It is true that in the early literature of Zoology, as, for example, in the works of Herodotus, Aristotle, Pliny, Ælian, and even much later, in those of Gesner, and Aldrovandus, we find very much that is fabulous, mingled with a little that is true; reminding us forcibly of Falstaff's "ha'p'worth of bread" to his "intolerable deal of sack." But the ha'p'worth of truth that is to be found amidst so much fable is well worth looking for; and it should be borne in mind that the old writers who collected information for their works on Natural History laboured under very great difficulties, with none of the advantages which we now enjoy in the shape of railway travelling, postal communication, and printed books. They had to rely upon their own individual researches, local traditions,

* An abstract of one of the "Davis Lectures," delivered at the Zoological Gardens, June 24th, 1886.

or the oral testimony of travellers, who themselves perhaps had only second-hand information to impart, and were doubtless frequently imposed upon.

Then again, except by the process of embalming, known only to a few, they had no method of preserving animals so as to enable their transportation to a distance. They had to rely upon descriptions given from memory, or upon very crude drawings not always taken from life, and therefore often very inaccurate. Under these circumstances it is not surprising that we should discover in their works a good deal of fiction; we should perhaps rather wonder at there being so much truth in what has come down to us; the more so when we reflect that even at the present day there is a vast amount of popular misconception concerning some of the commonest animals, which is only very slowly being cleared away,—so difficult is it to eradicate popular delusions which have once firmly taken hold of the public mind.

In the Beaver, about which I propose to say something to-day, we have just one of those animals which, imperfectly known to the ancients, would be most likely, from its singular conformation, to give rise to all sorts of curious speculations amongst those who had never seen one, or were unacquainted with its real habits and mode of life.

In the days when Whales were regarded as fish (as, indeed, they are nowadays by many uninformed persons) it was perhaps not unnatural to suppose that this curious animal, with a tail quite unique of its kind amongst mammals, might have some relationship to a fish, a surmise which would be strengthened by its reported aquatic habits.

A curious little work, entitled 'The History of Brutes; or a description of Living Creatures, wherein the Nature and Properties of four-footed Beasts are at large described,' was translated into English in 1670 from the Latin (1665) of Dr. Franzius, Professor of Divinity in the University of Witteberg, a man (as his translator tells us) famous in his time for his great learning. In this volume (p. 222) we find the following quaint account of the Beaver:—

"This is an *amphibious* creature, hath four feet, two of a *dog* and two of a *goose*; his fore part is hairy; he hath a long, broad, ruggid tail, like the tail of a fish; his feet are skinny, which maketh him swim with a great deal of ease; he cannot dive

long together being of very short breath; and therefore is fain often to put his head up above water for air: he biteth very hard, and loveth to be among fishes, or where they are: he may be like a thief in this thing, for he loveth to lye in the way that passengers come oftenest by. . . . . He loveth to be upon the banks of rivers and in those places where trees grow close to the water; and there he will sit with his body on the tree and his tail in the water: his subtelty is seen in this, that he will make a tree hollow with his teeth as if it were made so by art. . . . . The tree that he thus holloweth he maketh three cells in it, one above another; and if it raineth so that the tree is full of water, then he goeth up a storey higher, and according as the water decreaseth or increaseth, so he goeth up higher or lower in the tree; yet so that still he may keep his body dry, and his tail in the water.

"This may teach us," he says, "to forsee dangers that are coming upon us, and to arm ourselves against them."

The way in which some of these old writers loved "to point a moral and adorn a tale" must strike readers at the present day as somewhat amusing.

According to Albertus Magnus, a tree being cut down and prepared by Beavers, they take one of the oldest of their company (whose teeth are useless for cutting purposes) and make him lie flat on his back, pile up the wood upon him, neatly packed between his fore and hind limbs, and then drag him by the tail to the water-side, where their huts are to be built. He forgets that by such a process all the fur would be rubbed the wrong way, a course of treatment which no animal could be expected to submit to with complaisance.

Topsel, in his 'History of Four-footed Beasts,' 1658, describes the size of the Beaver as "not much bigger than a countrey dog," but he omits to mention the size of the dog! The tail, he observes, "he useth for a stern when he swimmeth after fish to catch them."

Another fable, attributed to Agricola, asserts that the Beaver keeps the Otter in subjection, makes him sit upon his tail in time of cold and frost, and keep moving about in the water in order to prevent it from freezing.

A mistranslation, or misunderstanding of an author's meaning, sometimes leads to amusing results. Pliny, writing of the

Beaver ('Historia Animalium,' lib. 8, cap. 47), says "the tail is like that of a fish; in the other parts of the body they resemble the Otter; they are both of them aquatic animals, and both have hair softer than down."

Quoting this passage, Franzius says:—"*Nam teste etiam Plinio fiber est lutra cui accessit cauda piscis, sed lutra est fiber sine cauda*" [*piscis*, understood]. But his translator, improving upon this (p. 223), puts it thus:—"Pliny saith that the Otter and Beaver are both the same, but in this they differ; the Beaver hath a tail, but the Otter hath no tail at all"! It need scarcely be said that this is altogether a libel on the Otter, which (as we all know) has a very fine tail, long, thick, and tapering.

What, then, is the zoological position and what the relationships of the amphibious Beaver, about which such marvellous stories have been told?

The form of the skull and the character of the teeth (two large incisors in each jaw separated by a wide interval from the molars, and no canines) show that it belongs to the order Rodentia, or gnawing animals, which feed entirely on vegetable substances. Although aquatic in its habits, it has nothing to do (as the ancients supposed) with the fish-eating Otter, which has a very different dentition, and belongs to the order Carnivora, or flesh-eating mammals.

The order Rodentia forms one of the most clearly defined groups of the Mammalia; a group which has representatives in all parts of the world, and the species of which are very numerous, especially in America, including, amongst others, such familiar animals as Hares and Rabbits, Squirrels, Rats, and Mice.

The most striking characters of the Rodents are those furnished by the teeth, so admirably adapted for their mode of life, and it will be observed, on examining the skull of a Beaver, that the incisor teeth have enamel *only in front;* so that, their posterior surfaces wearing away faster than the anterior, they are always naturally sloped or chisel-shaped. Their prismatic form causes them to grow from the root as fast as they wear away from the tip (their formative pulp being persistent), and this tendency to increase in length is so powerful that, if either of them be lost or broken, the corresponding tooth in the other jaw, having nothing to oppose or impede it, becomes developed to a

monstrous extent. Sometimes the width of the incisors is very great, exceeding the depth. This is noticeable in Rodents which burrow, and live almost entirely under ground, their powerful teeth being doubtless used to gnaw through the roots which would otherwise obstruct their subterranean progress. Those of the upper jaw are always shorter than those of the lower, and usually describe a little more than half a circle. The larger incisors of the lower jaw form a smaller segment of a larger circle.

The lower jaw is capable of horizontal movement, from side to side, as well as forward and back, the lower incisors moving to right and left of the upper ones, thus enabling the Beaver to masticate its food by a transverse and diagonal, as well as forward and backward, movement of the molars on each other.

The molars (four on each side in both jaws) have flattened crowns, the enamelled ridges of which are always set transversely, so as to be in opposition to the longitudinal movement of the jaw, the better to assist trituration. These flattened crowns sufficiently indicate that the food which they are intended to masticate is entirely vegetable.

The general form of the animal is stout and heavy, especially in the hinder parts; the tail is of moderate length, broad, flattened and covered with a scaly skin; the feet are all five-toed, the fore pair considerably smaller than the hinder ones, but all well furnished with claws, and the hinder pair fully webbed to the extremities of the toes.

The eyes are small, have the pupil vertical, and are furnished with a nictitating membrane. The ears are small and short, and their antitragus can be so applied to the head as almost entirely to close the auditory aperture; the nostrils are also so contrived as to be capable of being closed under water. The animal is thus admirably adapted in structure for the peculiar mode of life which it pursues.

With the exception of the Capybara of South America (*Hydrochærus capybara*), which is about one-third bigger, the Beaver is now the largest of living Rodents. It averages in length, from tip of nose to end of tail, about 42 in. (the tail alone measuring $9\frac{3}{4}$ to 10 in.), and 2 ft. 6 in. in girth, the weight varying from 30 to 50 and even 60 pounds. A Capybara shot by Darwin, at Monte Video, measured 3 ft. 2 in.

from the end of the snout to the stump-like tail, and 3 ft. 8 in. in girth, and weighed 98 pounds.*

Two remarkable animals of the Beaver tribe, but considerably larger than those now existing, formerly inhabited Europe and North America respectively, *Trogontherium* and *Castoroides*. They are both now extinct, but seem to have been contemporary with our Beavers. Their remains have been discovered in peat-bogs and lacustrine deposits posterior to the drift. The American genus *Castoroides* was much the larger of the two. It was more than twice the size of our Beaver: the length of its skull, for instance, was nine inches instead of four, while the European *Trogontherium* was a fifth larger than our Beaver.†

According to the zoological classification now adopted by naturalists, the Beaver is placed in the order Rodentia, sub-order Simplicidentata, and belongs to the *Sciuromorphæ* or Squirrel section of that suborder, forming the family *Castoridæ*, genus *Castor*, of which two species are recognised: the European Beaver, *Castor fiber*, confined to the temperate regions of Europe and Asia from France to the River Amoor; and the American Beaver, *Castor canadensis*, ranging over the whole of North America from Labrador to North Mexico.

Whether these two are really distinct species, or merely geographical races, is a question upon which opposite opinions have been expressed, Prof. Blasius,‡ for example, and Prof. Brandt§ stating that they cannot with certainty be separated; while Sir Richard Owen‖ and Professor Newton¶ maintain a contrary view. Messrs. Coues and Allen treat them as well-marked subspecies.**

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* Darwin, 'Naturalist's Voyage round the World,' p. 49.

† "Extinct species of *Castor* range back from the Post-pliocene to the Upper Miocene in Europe, and to the Newer Pliocene in North America. Extinct genera in Europe are *Trogontherium*, Post-pliocene and Pliocene; *Chalicomys*, Older Pliocene; and *Steneofiber*, Upper Miocene. In North America *Castoroides* is Post-pliocene, and *Palæocastor* Upper Miocene. The family thus first appears on the same geological horizon in both Europe and North America."—Wallace, 'Geographical Distribution of Animals,' vol. ii., p. 234.

‡ 'Säugethiere Deutschlands,' p. 407. § Mem. Acad. St. Petersb. vii. p. 43.

‖ 'British Fossil Mammals,' p. 196.

¶ 'On the Zoology of Ancient Europe' (1862), p. 25.

** 'Monographs N. Amer. Rodentia.' 4to, 1877, p. 433.

In point of size, coloration, and general habits, it may be said that no material difference can be detected externally between the two forms, but there appears to be a peculiarity in the skull, which is sufficiently constant to warrant specific separation. This peculiarity lies in the relative length of the nasal bones, which occupy one-third of the length of the skull. If a transverse line be drawn across the base of the nasal bones, it will be found that this line in the European Beaver intersects the orbits, while in the American Beaver it usually intersects the antorbital processes. The latter species, then, is distinguishable by its shorter and slightly broader nasal bones.

The prevailing colour of the Beaver's fur is reddish brown; rarely black; still more rarely white or particoloured. Hearne states that in the course of twenty years' experience in the countries about Hudson's Bay, though he travelled 600 miles to the west of the sea coast, he never saw but one *white* Beaver skin, and that had many reddish and brown hairs along the ridge of the back, the flanks being of a glossy silvery white.* Prince Maximilian states that *white* Beavers are occasionally found upon the Yellowstone River.†

The habits of the European and American Beavers are so similar that a description of those of the one might apply to those of the other, although it is remarkable that in parts of Europe where the animal is threatened with extermination it has so far modified its habits as to avoid building huts or "lodges," as they are termed, which would too readily betray its haunts, and prefers to live in holes in the river-bank (like a water vole), from which it is only expelled by the incoming water when the river rises, when it excavates a fresh cell at a higher level, and only as a last resource builds a hut upon the bank.‡ They frequently throw up dams across the streams frequented by them. These dams, which are destined to keep the water of variable streams up to the necessary height for the convenience of the Beaver, are wonderful pieces of work, and almost justify

* 'Hearne's Journey to the Northern Ocean,' p. 241 (1796).

† 'Travels in North America,' p. 332 (1843).

‡ It may be observed that the specific name *fiber* bestowed upon the European Beaver is derived from *fibrum*, denoting the edge or margin of the water wherein the animal loves to dwell, the generic name *Castor* being the Greek Καστωρ.—Herodotus, iv. 109; Aristotle, viii. 5, 8.

the marvellous stories told of its intelligence and sagacity by the older writers. They are often of great length—sometimes 150 or 200 yards and more—and run across the course of the brook inhabited by the Beavers,—sometimes in a straight line, sometimes in a curved form, according to peculiarities in the ground or the stream, and the exigencies of the engineers. They are composed, like the "lodges," of lengths cut from the trunks and branches of trees, filled in with smaller sticks, roots, grasses, and moss, and all plastered with mud and clay in a most workmanlike manner, until the whole structure becomes quite water-tight. Their height is from six to ten feet, and their thickness at the bottom sometimes as much as double this, but diminishing upwards by the slope of the sides until the top is only from three to five feet wide. These dams convert even small rivulets into large pools of water, often many acres in extent; and in districts where Beavers abound these pools may occupy nearly the whole course of a stream, one above the other, almost to its source. Their use to the Beavers, as constantly furnishing them with a sufficiency of water in which to carry on their business, and especially to float to their "lodges" the tree-trunks necessary for their subsistence, is easily understood; but it is a more remarkable circumstance that by this means the Beavers exercise a considerable influence upon the external appearance of the locality inhabited by them, which may persist even long after they have themselves disappeared. In and about the pools the constant attacks of the Beavers upon the trees produce clearings in the forest, often many acres in extent: at the margins of the pools the formation of peat commences, and under favourable circumstances proceeds until the greater part of the cleared space becomes converted into a peat-moss. These peaty clearings are known as "Beaver-meadows," and they have been detected in various countries where this animal is now extinct.

That the Beaver once existed in the British Islands, even within historic times, is a fact which renders it all the more interesting to us. It is mentioned in the Welsh Laws made by Howel Dha (A.D. 940), where the value of its skin is fixed at 120 pence, the skin of a Marten being at that date only 24 pence, and that of a Wolf, Fox, and Otter 8 pence.

Giraldus Cambrensis, in his description of his journey

through Wales in 1188, tells us that the Beaver was found in the River Teivi in Cardiganshire, and gives a curious account of its habits, derived apparently from his own observation. There is some reason for supposing that there were other rivers in Wales besides the Teivi which were frequented by the Beaver, as I have pointed out more fully in my 'Extinct British Animals' (pp. 36-39); and Boethius, the Scottish historian, writing in 1526, enumerates the Beaver amongst the wild animals found about Loch Ness. It is to be regretted that the written records which we have of its former occurrence in Great Britain are so few and fragmentary, but abundant evidence of its former existence in this country at a date long anterior to these historical notices is supplied by the remains of the animal which have been exhumed in various places both in England and Scotland.*

Many places in England seem to indicate by their names the ancient haunts of this animal; such, for instance, are *Beverley* in Yorkshire, *Beverage* in Worcestershire, *Bevercotes* in Nottinghamshire, *Beverstone* in Gloucestershire, and *Beversbrook* in Wiltshire.

In Ireland the Beaver was not only unknown in historical times, but there is no evidence of its having been found there in a fossil state.†

In Holland, according to Streso, a Dutch writer, the Beaver was killed for food in the time of the Crusades, and he repeats the old story that, being an amphibious animal, its tail and paws were allowed to be eaten on fast-days.

According to Baron Dunoyer de Noirmont, the last Beavers were killed in Holland in 1825.

France.—Although no author of antiquity makes any special mention of the Beavers of Gaul, in default of other evidence the names of several rivers and different localities in France sufficiently testify to the fact of its having been once locally abundant there.‡

* 'Extinct British Animals,' pp. 42, 43.

† See Leith Adams, "On Recent and Extinct Irish Mammals," Proc. Roy. Dublin Soc., 1878.

‡ Amongst others, for example, the following are mentioned by Baron Dunoyer de Noirmont in his excellent 'Histoire de la Chasse en France' (tom ii. pp. 112, 113): the river and village of *Bièvre*, in the environs of Paris; another river *Bièvre*, in the Departement de la Meurthe; *Bièvre*, in

Numerous remains of Beavers have been found in the peat-bogs of la Somme, where a few of these animals still lingered until a comparatively recent period.

The Carlovingian Kings, in their great hunting establishments, maintained a certain number of *beverarii*, as they were termed, or Beaver hunters, employed to capture these animals for the sake of their fur, which was always held in high estimation.

In the 18th century a few existed on the banks of the lower Rhone and its tributaries, especially the Gardon and the Cèse. The inhabitants of that district declared constant war against them in consequence of the great damage they did to the willows and osiers, which were then the principal source of profit to the riparian landowners, and they were either shot or taken in snares. The rivers just mentioned must be regarded probably as among the last haunts of the Beaver in France. Chenu states that specimens have been procured near Arles, Beaucaire, Tarascon, and even Avignon, and still existed, he said, in such numbers as to elicit his surprise that some authors should have referred to it as extinct in France. Of two which F. Cuvier had alive, one was from the Danube, and the other from the Gardon, in Dauphiny.

Some ten or twelve years ago there was a Beaver from the Gardon living in the Jardin des Plantes, Paris; and a few years before that (in 1856), another, which had been killed in the Département de Vaucluse, was forwarded to the Editor of the 'Journal des Chasseurs,' who presented his readers with a figure of it. In the same Département, at the Chateau de Caderousse, may be seen some stuffed Beavers which were killed in that neighbourhood.

In the latest work in which any mention is made of Beavers in France,* the author, the Marquis de Cherville, states that a few still exist on the banks of the Rhone and its affluents, particularly the Gardon; and that some have been met with also in the marshes of Picardy. A Paris naturalist, M. Deyrolle,

Laonnais; *Beuvron* in Sologne, and *Beuvronne* in Brie; *Beuvron* in Auge, and *St. James de Beuvron* in Normandy; *Beuvry*, le Nord and Pas de Calais; *Beuvray*, near Autun, &c.

* De Cherville, 'Les Quadrupèdes de la Chasse. 8vo. Paris, 1885. pp. 173—177).

showed him a recent skin of a Beaver from the Rhone, which, notwithstanding the zeal of his correspondents, he had been two years trying to procure.

In SPAIN, according to some of the old writers, the Beaver was at one time to be found; but I have been unable to collect any details of its former distribution in that country, nor to discover at what period it became extinct there.

In GERMANY, at the close of the last century, many localities are reported to have been frequented by Beavers; for example in Mark, especially in the Altmark and Preignitz, and in the Middle Mark; also in the rivers Spree and Havel, in the vicinities of Berlin, Potsdam, Oranienberg, Liebenwalde, Trebbin, Nauen, and Königshorst.

Bechstein, writing in 1801, tells us that on the Elbe, near Kähnert, the property of the Prussian minister Schulenberg, there were then many Beavers, which constructed dams on the side channels or arms of the river where there was calm water. Near Wittenberg also they lived in societies and formed dams. In the vicinity of Kettinghausen, on the Lippe, they built their dams, and were found in some numbers, as well as higher up the river in the territory of Paderborn. In these localities their habitations are stated to have been so skilful as to rival those of Canada, though the colonies were less numerous. The trees they cut down were willows and poplars.

Oken mentions a Beaver-hut on the Yesil, in the duchy of Cleves, which stood six feet high, with two chambers, one above the other, the upper having three and the under one four cells; and he refers to a paper by Meyerinck in the Berlin Nat. Hist. Transactions for 1829,* describing a colony, settled for upwards of a century on the little River Nuthe, half a league above its confluence with the Elbe in a sequestered canton of the district of Magdeburg. In 1822 it contained from fifteen to twenty individuals: they had burrows, built huts eight or ten feet high, using trunks and branches of trees along with earth, and constructed a dyke.

Martius, writing in 1837, speaks of colonies on the Amper, which were still tended as objects of forestry or huntsman's craft.

* Verhandl. Gesselsch. Naturf. Freunde zu Berlin, 1829, Bd. I., pp. 325—332.

Wagner, writing in 1846, mentions the Beaver as occurring not only on the Danube, but on the Amper, Isar, Iller, and Salzach, tributaries of that river, as well as in the Elbe and Oder; while in other rivers it had then only recently disappeared. Only forty years ago it was to be met with on the Amper, a Bavarian stream, a tributary of the Isar, and on the Moldau, a river of Bohemia, which falls into the Elbe. In the former they sometimes descended to the junction, and in the latter they were found chiefly in the great forest of Wittingau, belonging to Prince Schwartzenberg, who strictly preserved them,* though occasionally, but very rarely, its tracks were to be seen on the sands of the low islands near Prague.

The Brothers Stuart, writing in 1848, thus refer to the Beavers of the Moldau†:—"The varieties of wood and lake game in the moorland forests of Wittingau unite a diversity of sport rarely combined in the same range; but the most interesting of their productions are the Beavers, which are to be found in no other part of the Austrian states, and here breed principally on the Neulach, the Miser, and the Luschnitz, tributaries of the Moldau; they live in single families far removed from each other, as the stronger always expel the weaker from their neighbourhood. They are now (1848) strictly preserved, but as the streams which they inhabit are march waters (*i. e.*, boundaries), their numbers are continually diminished by the people of the neighbouring seignories. . . . . The Moldau Beavers subsist on the bark of trees, preferring the aspen and willow, but eating also that of oaks and fruit trees."

In North-Western Germany, Beavers existed formerly in the Moselle and the Maas. Blasius asserts that a Beaver was captured in Brunswick, in the Schunter, at the end of the last century; that fifty years later they were observed on the Lippe in Westphalia; and that when he wrote (in 1857) they were still to be found on the Elbe between Madgeburg and Wittenburg, though the colonies since 1848 had become greatly reduced. He adds that they had been then lately observed on the Havel and Oder, in the Altmark.

A correspondent of the 'Cologne Gazette,' writing from

* Liebich, 'Compendium der Jagdkunde.' 8vo. Wien, 1855.

† 'Lays of the Deer Forest,' vol. ii. p. 216; and Append., p. 447.

Wittenberg in February, 1878, remarked that the Beaver, which had become so scarce in Germany, had again taken up its abode near the village of Wittenberg, and that four pairs had been then recently counted in an old channel of the river. Below the village, towards the Anhalt frontier, several Beaver dams had been discovered, but the animals themselves, though betraying their presence by cutting down willows and other trees, were seldom seen out of the water. The fishing on this stream belonging to the Crown, strict injunctions were given to the inspectors not to molest the Beavers, which were accordingly well protected. It would be interesting to know whether they are still there.

In SWITZERLAND, in the 16th century, Beavers were to be found in the Aar, the Limmat, and the Reuss, and up to the last century a few still lingered on the banks of the last-named stream, on the Thiele, and the Byrse.*

According to Sir John Lubbock, a few survived until the beginning of the present century in Lucerne and Valais.†

IN LAPLAND some of the last Beavers were killed by persons spearing fish at night with torches. The late Mr. John Wolley took great pains, during his sojourn in that country some five-and-twenty years ago, to ascertain particulars of its history, and he obtained from an old man the skull of the very last Beaver known to have been killed within the Arctic Circle some twenty-five years previously (about 1835), and which had been preserved as a curiosity in his cottage. This specimen is now in the Museum of the Royal College of Surgeons.‡

As regards NORWAY and SWEDEN, little or no accurate information concerning the present distribution of the Beaver in that country was forthcoming until Mr. A. H. Cocks, in 1880, detailed the result of his search for it there. Lilljeborg,§ Nilsson,‖ Blasius,¶ and Giebel,** had stated vaguely and in

* Troyon, 'Habitations Lacustres,' and von Tschudi, 'Das Thierleben der Alpenwelt.'

† Lubbock, 'Prehistoric Times,' 2nd ed., p. 200.

‡ Newton, 'On the Zoology of Ancient Europe,' p. 25.

§ 'Sveriges och Norges Däggdjuren,' 1874, pp. 346—382.

‖ 'Scandinavisk Fauna' (Daggdjuren), i. pp. 409—427.

¶ 'Säugethiere Deutschlands,' 1857, p. 407.

** 'Die Säugethiere,' 1852, p. 619.

general terms that the animal was still common there, but gave no particulars. Bowden in his 'Naturalist in Norway,' 1869 (p. 73), says:—"The Beaver was formerly very common in Norway, and was principally found in Soloer, Osterdalen, Gudbrundsdalen, and Jemteland; there is still a 'Bœver-dalm' and a 'Bœver-elv' in Osterdalen." He adds, "It is now only to be met with on the estate of a Mr. Aall, a gentleman who resides near Arendal, in the south of Norway."

Mr. Cocks was informed that in the neighbourhood of Osterdal, in the Slem Aa, a tributary of the Rena Elv, the last Beaver was killed about 1855; but he ascertained the existence in 1880 of at least three colonies in other parts of the country, and of these he has given an interesting account in 'The Zoologist' for 1880 (p. 233), suppressing only the names of the exact localities, for the better protection of the colonists. Some further particulars on this subject, gleaned during a second visit to Norway, are given in a subsequent article in the same volume (p. 497), and Mr. Cocks sums up (p. 501) by expressing his opinion that in 1880 there were probably not sixty adult Beavers in the whole of Norway.* When in Christiania, in October, 1884, he saw an adult male Beaver, in the flesh, which had just been shot at the principal colony in the South of Norway; it measured 3 ft. 4 in.; tail, 10 in.; and weighed 39 lbs. 10 ozs.

In Sweden he had only heard of two districts where it was possible that Beavers might still exist, but on visiting these in the autumn of 1881 he could not learn that any had been heard of for about thirty years (Zool. 1882, p. 15).

Very few remains of this animal are to be found in the Museums of Scandinavia. At Trondhjem, for example, there are only three or four broken pieces of jaw, and the skin of a tail; at Stockholm there are three stuffed specimens from Sweden and Germany, and at the Göteborg Museum there is no European specimen to be found.

In the tomb of an ancient Lapp, opened about thirty years ago at Mortensnœs, on the Varangerfjord, in the extreme north-

* Prof. Collett, of Christiania, in an article on the Beaver in Norway, published in the 'Nyt Magazin for Naturvidenskaberne' (1883, Bd. 18, Hefte 1), estimated the number of Beavers in Norway at that time to be about a hundred, and he did not consider that they were decreasing. It is satisfactory to learn that they are now being protected by law from destruction.

east of Norway, were found three Beaver's teeth, and a rude stone hammer, bearing marks of use, lying by the side of a human skeleton.* This discovery is of peculiar interest to the archæologist and ethnologist, as supplying another of the many interesting examples of analogies in the resources of primeval arts; for we know that the Beaver-tooth with its broad and sharp edge furnished the American Indians with one of his best cutting instruments previous to the introduction of iron tools. Dr. Richardson states that the incisor-tooth of the Beaver fixed in a wooden handle was used by the Indians of the North-West to cut bone, and fashion their horn-tipped spears and arrows till it was superseded by the English file.

In DENMARK, as we learn from an interesting report by Prof. Steenstrup,† remains of the Beaver have been found in the peat moss of Christiansholm, and in Fyen; previously discovered traces of it within Danish territory, having been limited to Sjælland, where tree-stems from two to four inches thick with evident marks of Beavers' teeth upon them, have been found in the peat mosses of Mariendals and Brönsholm. When the Beaver became extinct in Denmark I have not been able to discover.

RUSSIA, LIVONIA, and POLAND, could all claim the Beaver amongst their indigenous Mammalia.

In NORTH RUSSIA, according to Oken, Beavers were to be found on the Dwina, and the Petchora; and in the south, according to Demidoff, they were regarded as somewhat scarce on the Danube, but more common in the region towards the Caucasus; while at the date at which he wrote (1842) many had been killed in the districts watered by the Natanebi, and the Tereck.

In the Baltic province of LIVONIA, during the last century, Beavers were not uncommon, especially on the Middle Aa. About 150 years ago they built in the north of Livonia, on the Pernau and its tributaries, and occasionally on the Embach, but especially in Central Livonia, on the Aa, and in Sedde. They may also have occurred in Salis, and on the Duna and its

* 'Forhandlinger af Danske Videnskab. Selsk. Illustreret Nyhedsblad' (Christiania), 1856, p. 104.

† 'Oversigt over det Konigl. Danske Videnskabernes Selskabs Forhandlinger,' 1855, p. 381.

tributaries, the Oger, Perse, and Erst, in the south. Fischer in in his 'Versuch einer Naturgeschichte Livlands,' 1871, states that in 1724 the colonies of Beavers there built dams of great height, and thereby greatly increased the inundations.

That the Beaver was formerly well known in those parts is shown by the number of places in Lettish Livonia that are named after it; for instance, the Beaver-beck and Beaver-court Estates; Beaver birch wood, Beaver brook, and Beaver hill.

Until the end of the last century the inhabitants of Sedde supplied castoreum to the druggists at Fellin, and so late as 1830 it was obtained from Walk, in the Aa district. But it would seem from the researches made by Herr von Loewis, who has published a very interesting article on the extinction of the Beaver in Livonia,* that since the year 1818 the Beaver has frequented only the Middle Aa. Solitary individuals, he says, may have strayed into other parts; but this is doubtful, since the Aa district of Walk is the only place where there is positive evidence of their occurrence.

In 1832, after an interval of two years, the druggists at Walk, received the last pair of "castorum sacs" from indigenous Beavers. They weighed 11 ozs., and realised 15 roubles, or 45 shillings per *loth*, i. e., half an ounce, in other words, £4 10*s*. per ounce. The owner had obtained them from a postilion at Stackeln, who had that year trapped the Beavers from which they were taken. For some years these were believed to be the last of their race in Livonia, until in the autumn of 1840, on the estate of Neuhof, in the upper reaches of the Aa, east of Walk, a single Beaver was tracked and hunted, but without success. At length in the summer of 1841, on the borders of the Crown lands of Aa-hof, this sole surviving Beaver was shot by a gamekeeper named Neppert. It was veritably the last of its race, for since then diligent enquiry has revealed no traces of any Beavers in Livonia.

In Siberia, according to Wylie (Russian Military Pharmacopœia), the Beaver was at one time as common as it was in Russia; and in Western Siberia used to flourish on the Bobrofka, one of the affluents of the Irtysh. It is now, however, extinct

* 'Der Zoologische Garten,' 1878, pp. 353—357, translated in 'The Zoologist,' 1880, pp. 215—217.

there, but continues to survive on the rivulet Pelyin, from whence in 1876 M. Poliakoff procured five skins from an ostyack on the Obi, and commissioned a hunter to obtain some perfect specimens there for the Museum of the St. Petersburg Academy.* In Eastern Siberia, according to one of the most recent travellers who has given any account of the fauna of that country, Mr. Henry Seebohm, the Beaver has been extinct on the Yenesay for many years.†

The habitat of THE AMERICAN BEAVER is an unusually wide one, not surpassed by that of any other animal, including even the Deer and the Fox. It has been found from the confines of the Arctic Sea on the north, to the Gulf of Mexico, the Rio Grande, and the Gila rivers on the south, and even southward of these ranges in Tamanlipas in Mexico, which is the southernmost point to which it has been definitely traced. Throughout all the intermediate area, from Hudson's Bay and the Atlantic on the east to the Pacific on the west, it has been found generally distributed.

Numbers were to be found in the thickly-wooded country around Hudson's Bay, around the shores of Lake Superior, upon the head waters of the Missouri, and the Seskatchewan, and upon the tributaries of the Columbia. The regions bordering on the Yukon, on the upper part of Mackenzie River, on Frazer's River, and on the Sacramento were also noted for Beavers.

New England, New York, Pennsylvania, and the Canadas were less abundantly but very well supplied at the period of colonization. Southward towards the Gulf they were less numerous, and in the vast prairie area in the interior of the continent they were confined of course to the margins of the rivers.

With the commencement of colonization their habitat began to contract. They have now practically disappeared from the United States east of the Rocky Mountains, except in the States of Michigan, Wisconsin, Minnesota, and Iowa; and in the territories of Nebraska, Dakota, Idaho, Montana, and Colorado. They are still occasionally seen in Maine, New York, and Virginia.

In the Hudson's Bay territory, and in some portions of the Canadas, and west of the mountains in Oregon, Washington,

* 'The Zoologist,' 1877, p. 172.

† Seebohm, 'Siberia in Asia,' p. 43.

California, and Nevada they are still numerous, as they are also in Upper Michigan, on the southern shore of Lake Superior.*

Having glanced thus hastily at the past and present distribution of the Beaver in the Old and New Worlds, we may consider briefly the principal causes which in so many countries have led to its extermination.

In ancient as in modern times the Beaver was sought after for the same purposes, namely, for *dress*, *food*, and *medicine*.

From very early times its skin was considered a royal fur, and its acquisition when opportunity occurred, as in the case of the Marten and Ermine, was a prerogative of the Crown. We have seen how the Welsh Code of Howel Dha (A.D. 900) fixed a value upon the skins of 120 pence. Similarly the *Leges Burgorum* of David I. of Scotland (A.D. 1150) fixed the export duty upon the skins of Beavers along with those of Fox, Marten, and Wild Cat.

This Scottish Code is copied nearly *verbatim* from the laws and customs instituted for Newcastle-on-Tyne by Henry I., and confirmed by subsequent royal charters; and among the exports from the Tyne are specified the skins of Foxes, Martens, Sables [*i. e.*, probably Polecats], Beavers, Goats, and Squirrels.† Thus it appears that the Beaver was known in Wales in the 10th century, and its skins were exported both from Scotland and England at least till the middle of the 12th century.‡

When the indigenous British Beaver became extinct, and native skins could no longer be obtained, the fur, used for trimming and lining cloaks, had to be imported; but it was not until some time after the discovery of America that Beaver-wool became the indispensable material for the fashionable European hat. In 1638 Charles I. by royal proclamation prohibited the use of any materials except Beaver-wool in the manufacture of hats, unless made for exportation. This amounted to a declaration of war against the Beaver colonies in the North American settlements and Hudson's Bay Company's territories, and within

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* Morgan, 'The American Beaver and his Works,' 1868, pp. 32, 33.

† 'Archæol. Inst. Newcastle; Memoirs of Northumberland,' vol. i., p. 27.

‡ In an Act of the first Parliament of James I. of Scotland, held at Perth in 1424, regulating the "custome of Mertrik skinnes and uther furringes," the Marten, Polecat, Fox, Otter, and other skins have their export duties specified; but the Beaver, which figured among Scotch exports in the reign of David I., no longer appears.

less than a century afterwards the animal was nearly exterminated in the country south of the St. Lawrence and the Great Lakes.

The French traders in 1743 imported into Rochelle 127,080 Beaver skins, and the British Hudson's Bay Company sold 26,750 skins the same year. In less than fifty years later, when Canada had become a British possession, the trade in Beaver skins seems to have reached its maximum, and to have been maintained with only a slight decline till the commencement of the present century. In 1788 upwards of 170,000 Beaver skins were exported from Canada, and Quebec alone in 1808 supplied this country with 126,927, which, at the estimated average price of 18*s.* 9*d.* per skin, would produce no less a sum than £118,944. The result of the continuance of such wholesale destruction may well be imagined. No wonder that in some places the animal became exterminated. and in others comparatively scarce.*

The additional persecution to which it was subjected, more particularly in Europe, for the sake of its flesh as food, and for the peculiar secretion known as castoreum, which was used medicinally, contributed still further to hasten its extermination in many places where it was once common. The convenient mediæval creed which converted the amphibious rodent into a suitable Lenten dish when flesh was forbidden no doubt added to the zeal with which the Beaver-hunt was pursued. It is asserted by ancient writers that only the tail sufficiently resembled fish to allow of its being eaten on fast-days; but certain modern authorities claim that the entire animal was *maigre*. On this point opinions differ.†

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* After the substitution of silk for fur in the manufacture of hats, the value of Beaver pelts greatly declined; thus affording a respite to this persecuted animal, under the effects of which it is now increasing in certain localities. This is particularly the case on the Upper Missouri, and in the great forests around Lake Superior; but it is not at all probable that they will ever recover in any locality their former numbers. In 1862 Beaver pelts were worth at Fort Benton, on the Upper Missouri, one dollar and a quarter per pound, against seven and eight dollars per pound fifty years ago. They are now worth two dollars per pound on the south shore of Lake Superior. An ordinary pelt weighs from a pound and a half to a pound and three-quarters.—Morgan, 'American Beaver,' p. 228.

† See Dunoyer de Noirmont, 'Histoire de la Chasse en France,' vol. ii., pp. 113, 114. Rolland, 'Faune Populaire de la France,' p. 68.

With regard to the *castoreum* so long known to the ancients, and at one time so valuable that it fetched 40 roubles or £6 an ounce, a few words may be said. It is simply an odorous animal product analogous to musk and civet (though at the preeent much less familiar than these are), secreted and carried into two little glands or sacs placed near the root of the tail on its under side, and situated just above a pair of smaller oil-glands. These sacs are formed of several layers of connective tissue, lined by a delicate membrane, which is coloured by the secretion. The castoreum is light or dark yellow in different cases, soft, adhesive and gritty from the presence of calcareous matter, and has a strong peculiar odour. Under the microscope it shows granular and epithelial matter, and spherical crystals of carbonate of lime. The European castoreum is supposed to contain a larger proportion of the volatile oil, castorin and resin, and probably its superiority as a medicine depends upon the resinoid element.

Castoreum may be regarded as the prototype of "Holloway's Ointment" or "Cockle's Pills," for it was supposed to cure half the diseases under the sun. Pliny, for example, tells us (Book 32, chap. 13) that it was employed for the cure of vertigo, spasms, affections of the sinews, sciatica, paralysis, epilepsy, as a neutraliser of aconite, as an antidote to white hellebore, as a cure for tooth-ache (when mixed with oil and injected into the ear on the side affected), and as a remedy also for ear-ache. He adds that "applied with attic honey in the form of ointment it improves the eyesight, and when taken with vinegar it arrests hiccup." What more could be desired? At the present day, of course, its use has been superseded by other medicines, doubtless much more efficacious in their operation. Had these only been discovered a little earlier, the Beaver might still be roaming in haunts where the importunities of druggists have now caused its extinction.

There is just one more point to which, before concluding these remarks, I can hardly forbear to allude, and that is the highly interesting fact that the Beaver has produced its young in the Zoological Society's Gardens. It might be supposed that this circumstance would have furnished opportunity for many interesting observations in regard to the number and condition of the young at birth, their rate of development, and so forth; and might have resulted in the elucidation of certain points of

importance which are still undetermined. To one such point only I will allude, namely, the condition of the young at birth. It is a very remarkable fact that in the Rodents this differs considerably in different species. Take the case of two such familiar animals of this order as the Hare and Rabbit. Young Rabbits are born blind and nearly naked, and remain in this helpless condition for at least ten days or a fortnight; young Hares are born clothed with fur, and with the eyes open; and are able to run about and feed on the second day after birth. This curious difference is doubtless correlated with the different conditions under which the two species are placed at birth, young Rabbits being born under ground and in the dark, while young Hares are produced above ground in a "seat" or "form," as it is termed, and exposed to the light of day.

How is it with young Beavers? At the present moment I am unable to say. I have consulted a great number of works in which reference is made to this animal without being able to discover any information on this point, and conclude therefore that the question has not yet been answered in print, although to those who have hunted and trapped Beavers, or studied them in their proper haunts, it must doubtless be known. Mr. Bartlett informs me that on the occasion of the birth of young Beavers in the Zoological Gardens the animals were so exceedingly shy, rarely showing themselves except at night, that it was impossible to ascertain either the number, or condition of the young; and whenever a young one made its appearance, it was immediately carried back to its lodge by the old one. We know, however, from other reliable sources that the number of young in a litter varies from two to five, and very rarely six.* They live with their parents until the following spring, when they are driven away to shift for themselves.

Within the last ten or twelve years, as most people are probably now aware, the Beaver has been locally reintroduced into Scotland by the Marquis of Bute. In 1874 a space of between three and four acres was enclosed in a wood on the Island of Bute, and four Beavers were turned out. The following spring seven others were liberated, and they have since increased and

* Hearne, 'Journey from Prince of Wales's Foot to the Northern Ocean,' 4to, 1725, p. 226. Morgan, 'The American Beaver and his Works,' 8vo, 1868, p. 314.

are thriving. The keeper who has charge of them, Mr. G. S. Black, published in 1880 a very interesting account of their doings. This is quoted in full in my work on 'Extinct British Animals' (printed the same year), in which will be found a great deal more information concerning the British Beaver than it has been possible for me to detail on the present occasion.

NATURAL HISTORY AND SPORT IN THE HIMALAYAS.

By Surgeon-General L. C. Stewart, F.Z.S.

With three weeks' leave of absence, I started from Kussowlie at dawn of day, October 1st, *en route* for the mountains beyond Simla, on ornithological pursuits intent. Kussowlie, a pretty military cantonment in the N.W. Himalayas, where my regiment was stationed, has an elevation of about 7000 feet, and is situated on the first range of the Himalayas from the plains, one stage of eight miles from Kalka, at the foot of the hills. Simla is about thirty-three miles distant N.W. by a good bridle road.

During the year I had passed at Kussowlie I had been pretty busy collecting, and had a tolerably good assortment of hill-birds, chiefly, however, the summer residents and denizens of the lower ranges; and I was anxious to collect in the higher mountains, and particularly in the pine-forests beyond Simla. In these days I was in constant correspondence with Blyth, in Calcutta, who at my request had sent me a good birdstuffer in the shape of a young Portuguese of his own training. Gomez was his name, idleness and lying his nature; but he was excellent in his own department of skinning birds, &c., and preparing skeletons. I had as a companion for the trip Capt. T., of a native infantry regiment then on leave at Kussowlie, a good shot, and devoted to Ornithology; and it was arranged that he should join me a stage or two beyond Simla. As there were staging or "Dawk" bungalows all the way to Koteghur, which, as far as we knew, was to be our *ultimatum*, we did not encumber ourselves with tents or superfluous baggage. We took most of our supplies from Kussowlie and there engaged our hill porters, sending them on ahead under a trustworthy servant of T.'s. Mr. Gomez accompanied the party, bestriding a screaming and fractious bazaar pony, and they were to await my

arrival at Mahassoo, the first stage beyond Simla, where my friend Capt. H. had a beautiful cottage, and had promised to put me up. I had engaged to reach Simla in time for a late breakfast at Rockbank, a house which the officers of my regiment had rented for the season, and to which they used to resort in parties for a few weeks at a time, according as they could get leave of absence from regimental duties.

Kussowlie itself is rather a slow place. We had it all to ourselves most of the year, but during the gay and festive Simla season we used to be enlivened by lots of visitors passing through. I reached my destination in due course by means of half a dozen ponies "laid on" at every six or seven miles, and after breakfast proceeded to an emporium to make sundry purchases, including a good supply of ammunition; and my friend Major L. made me take his rifle on the chance of my falling in with big game, although I had not intended encumbering myself with one. The road from Kussowlie descends for a mile and a half by a series of steep zigzags, and then there is a pretty level stretch for several miles; and as I sauntered along I did not much look out for birds.

Below the road branching off to the Lawrence Asylum, at Sunawur, I disturbed a party of eight or a dozen of the handsome Himalayan Blue Pie, *Psilorhinus occipitalis*, which were making a great noise about something as they flew to and fro across a wooded ravine. I pulled up to watch them for a minute or two, when, as if by common consent, they closed in, left off their screeching, and sailed away in single file; displaying to advantage the beautiful different shades of blue on wings and body, and long graduated white-tipped tails. It is the handsomest of the Jay or Magpie tribe in these hills, not yielding the palm for beauty to the lovely *Cissa venatoria* of the eastern countries. As I rode along the river-side, near the suspension bridge at Hurreepore, I noted two species of Redstart, *Ruticilla leucocephala* and *R. fuliginosa*, and the ubiquitous *Ceryle rudis*, but no other Kingfisher. Jays of both species, *Garrulus lanceolatus* and *G. bispecularis*, abundant in the woods. *Leiothrix luteus* in small parties, picking up what they could get on the road, and hardly getting out of the way. Several kinds of *Garrulax*, in suitable localities; and on the grassy slopes about the road a Finch or two, which I could not identify, and an Accentor, probably *A. variegatus*. Noisy parties of the Mountain Parrakeet, *Palæornis schisticeps*, swept past over-

head, and the cooing of Doves and the tapping of an occasional Woodpecker were not wanting.

Riding up the last long and beautiful ascent to Simla, I came into the region of the *Rhododendron arboreum*, now rather an ugly tree. The last time I was there was in its flowering season, when the whole hill-side seemed on fire,—a blaze of splendid crimson blossoms; and many of the trees covered with the climbing wild white rose, *R. Brunoni*. Numerous birds of many species and much interest appeared on the scene, among which I identified, as I rode along, several species of *Parus*, *Turdus castaneus* and *T. atrigularis*, a *Sitta* and a *Certhia*, a black and white Woodpecker, *Picus Macei*, and a large green one, *Gecinus squamatus*. The only raptorial birds I spotted in my ride were some Kites below the barracks at Subathoo, a Bearded Vulture or two sailing along the face of the hill at Keeree, several of the Great Himalayan Vulture, *V. fulvus*, and a pair of the Tawny Eagle, *A. fulvescens;* and I heard the scolding of a family of Owls, probably *Athene radiata*, as I rode down the Kussowlie Hill.

I had nothing to do at Simla beyond the purchase of a few stores and my ammunition, so I set off directly after my late breakfast for Mahassoo, distant eight and a quarter miles. I noticed several desirable birds *en route*, but, as I had not my gun with me, they were safe. *Hypsipetes psaroides*, whose native name is Bun-Bukree, or Forest Goat (may be from its voice), is particularly at home hereabouts, and rather a wearisome bird from its incessant squawking. An allied species is found on the Nilgherries, also most vociferous. A small Falcon, I believe *F. subbuteo*, alighted on a tree close to me, and several Kestrels scoured the valley or hovered above it. There was a Shrike, which I made out to be *L. tephronotus*, and now and then a Drongo Shrike, *Dicrurus longicaudatus*. I got another species, *D. cærulescens*, a few days on at 4000 ft., and I do not think it goes much higher. The pretty *Ruticilla cæruleocephala*, the only Redstart observed, and that sparingly, on bushes by the road-side. It is very common at Kussowlie in winter, but disappears for higher elevations the beginning of summer. Jays and Laughing Thrushes as usual, and *Pari* in the oak trees. *Siva strigula* in small parties, and *Leiothrix luteus* in larger. I saw a Wall Creeper, *Tichodroma muraria*, on a cliff above the road; this pretty bird breeds on the hills, and visits the plains—the

Punjab at least—in the cold weather. Just at dusk I put up a Goatsucker at the road-side, and regretted for its sake I had not my gun; I believe it was *Caprimulgus monticolus*.

Near dusk we reached Capt. H.'s house, for I had more than once lost my way and been misdirected. I found that my host had that morning gone into Simla, but was expected back to a late dinner; so after a bath and change of raiment I summoned Mr. Gomez, and made him give an account of his proceedings during the week, for, as I have already said, I had sent him on ahead from Kussowlie with a spare gun, and had instructed him as to what in particular I expected, and wanted him to procure for me. He had been out in the forest daily, and had gathered together really a creditable assortment of birds; and had furthermore engaged, subject to my approval, a well-known Shikaree. I soon made terms with the man, and he proved a valuable addition to our party. He was a very fair shot, and could preserve large birds or mammals. He knew every inch of the country all around; moreover, he promised to introduce me to *Monaul* and other game, and he was as good as his word. He would not take permanent service, though I would gladly have disbanded Mr. Gomez, and enlisted him. However, he preferred a life of greater freedom, and had a wife and other encumbrances. I found him faithful and honest, and we became friends in our way very soon. He sent me afterwards many good contributions, birds and beasts, and refused payment, till I forced it on him. I also supplied him liberally with ammunition and arsenical soap. He came to Kussowlie next spring to see me, and a trip was arranged for the far interior. I gave him a single barrel gun for some good heads he had preserved during the winter,—Tahr, Serow, Burrell, &c.,—and which he had brought to present to me. Poor Oosrao! that was the last I ever saw of him, for I heard of his death by small-pox a month afterwards, to my great regret.

To resume. Mr. Gomez's spoils included several examples of species new to my collection, although I afterwards got duplicates of most of them:—(1) The black and yellow Grosbeak, *Coccothraustes icterioides*, I had never before seen, but recognised it readily; and I got altogether ten specimens of it during the trip. It is most partial, as far as I have seen, to the pine-clad mountains, and is consequently common at Mahassoo. I found it also at

Koteghur, busy in the apricot orchards, where it is voted a nuisance, as it destroys and wastes much of the fruit for the sake of the kernels. Of the other two Himalayan species of Grosbeak, *C. melanoxanthus* is said to extend to Darjeeling, and *C. carnipes* is limited to the S.E. Himalayas. I have never observed either of them myself. Some years afterwards, on looking over a collection of birds belonging to Major Blagrave, of the Trigonometrical Survey, I found some examples of a large Grosbeak which seemed different from any of the above-named, and which had been shot in the hills beyond Murree, in the far N.W. On sending them to Calcutta they were pronounced new, and named by Blyth *C. affinis*. (2) A fine fishing Owl, *Ketupa flavipes*. (3) *Aquila Bonelli*, as it now stands, but known by many other scientific names; this was a very fine adult female. (4) A small horned Owlet, probably *Scops lettia*, a dark grey specimen. Is it only a variety of the chestnut phase of plumage? This pretty little Owl had been shot only that evening, and was untouched; the irides were dark brown. (5) The only other novelty was a remarkably large Field Lark, *Mirafta*, which seemed to differ from those described in being unspotted grey above, and pale fiery red below. Capt. T. did not know it, so I laid it aside to send to Calcutta for identification; but somehow that was mislaying it, and eventually I know not what became of it. I believe it was a new species. Gomez said he shot it on the bare hill-side, half-way from Simla. The Shikaree had that morning shot a brace of Kalij Pheasants, and a Kakur, or Barking Deer. As I was pretty well done up after a thirty-two mile ride and an eight mile walk, I dined on what I could get; and so to bed, without seeing Capt. H. till the morning.

Mahassoo, Oct. 2nd.—For the first time this morning I heard and then saw the Himalayan Nutcracker, *Nucifraga hemispila*, which is very common in the pine-forests. I never saw it elsewhere, and it is unknown at Kussowlie or Landour; but abounds here, flying about in pairs or small parties. I recognised its loud discordant voice before I was out of bed. Capt. H. says it breeds in the pine-forest, building a nest of small twigs, lined with fir-needles and bits of moss. He had not taken the eggs, however. Another fine Nutcracker, *N. multimaculata*, has been brought from Cashmere, but I have never seen it.

The situation of Capt. H.'s house is beautiful. Gigantic

deodars surround it on all sides, and the slopes of the hills used to be entirely covered with this stately tree. A good deal of the forest has lately been cut down, and the land thus reclaimed has been devoted to potatoes, which thrive remarkably well, and are much used by the hill-men, or taken for sale to the neighbouring stations; they are invariably roasted in the ashes by the Paharees, who have not yet taken to boiling them. I had never been in a forest of deodars before, and found its grandeur impressive; but there were few species of birds procurable, and on this account I was somewhat disappointed. There were two species of Green Woodpeckers, *Gecinus squamatus* and *G. occipitalis*, about equally common, and conspicuous by their harsh, rattling call, and their peculiar flight. I got also good specimens of other Woodpeckers to-day: *Picus Himalayanus*; *P. pygmæus*, which I more than once noticed in parties of half a dozen; and *P. brunneifrons*, which is probably the most common species. A single *Gecinus flavinucha* was observed, but I missed him. Several noisy parties of *Garrulax* were seen, but I did not ascertain the species, *G. erythrocephalus* and *G. variegatus* most probably. In a considerable clearing of the forest I came on a party of nearly a dozen of *Pomatorhinus erythrogenys*, busily turning up the fallen leaves and keeping up an animated conversation the while. This congregation surprised me, for they are usually found in pairs, as are the other species of the Scimitar-billed Babblers. It is a common bird all over these hills, so I only fired into the flock to verify my observation, knocking over a pair. A much prettier species is *P. leucogaster*, which keeps more to the lower ranges, descending to the foot of the hills in winter. A third, *P. Horsfieldi*, is restricted to the Nilgherries and the Western Ghats. They are common at Mahableshwur, and there go by the fancy name of "John and Mary," from the quaint answering notes of the male and female birds. *Sibia capistrata* was common in pairs. It is a lively neatly-plumaged bird, noisy, and by no means shy. I have never met with it off the hills, but *there* it has a wide range. I have several times brought it up from the nest, feeding it on plantain, guava, and other fruit.

In the afternoon, as I was toiling up the steep pine-clad hill towards the house, I heard the note of a Woodpecker, which sounded strange to me, for by much watching by eye and ear I was then pretty well "posted" in Woodpeckers, always a favourite

group with me. After a good while watching and peering overhead in search of the owner of this strange voice, whom I could not see, but whose talking I could hear, the bird flew off, but only to throw itself on the trunk of an adjacent pine. I secured it at once, and saw for the first time "in the flesh" a specimen of *Picus hyperythrus*, undoubtedly a rare bird, at least in this part of the hills. I subsequently got three more examples of it at long intervals. It is a handsome species, of medium size, and the coloration is unique among Indian Woodpeckers, being uniformly pale chestnut or bay-red below; the upper parts black, with white bars, like many others of its kindred. The male has the head fine crimson, and the female black, with pale streaks. This specimen was a male. Its particular note is hard to describe. Most of the tribe have a harsh rattling cry, usually uttered on the wing, or when about to alight or throw themselves on the tree-trunk they have selected. My bird's voice was of two notes, on an ascending scale and oft repeated, and void of the harshness characteristic of the cry of the green species or of its kindred with the black and white upper plumage. I observe that the learned have victimised this bird as the type of a new genus, "*Hypopicus*," for the same reason (?), good lack! that they have multiplied the genera of Spotted Woodpeckers into *Yungipicus*, *Leiopicus*, and so on. Is there any structural difference in this bird warranting its generic isolation beyond the somewhat slender bill? I once possessed specimens of eighteen distinct species of Woodpecker from Upper India and the Himalayas, and on referring to "the authorities" I find them allotted to thirteen distinct genera. This exasperating manufacture of genera is even worse in some other groups I could name.

My shot disturbed some large Wood Pigeons, which turned out to be the beautiful *Columba Hodgsonii;* they were very wild, but I secured a brace with green cartridges after some fatiguing stalking, and many more specimens on future occasions fell to my gun. The hill Shikarees constantly bring them in with other Pigeons, &c., for sale, and it was thus I secured my first indifferent specimens the year before at Kussowlie. The Himalayan Cushat (if it be distinct from the British bird) is found only in the N.W. Himalayas, where I have seen it in flocks on the gleaned harvest terraces below Kussowlie in autumn; and a Blue Pigeon, supposed to differ from the common kind abounding on the plains and named

C. rupestris, is said to occur hereabouts, but hitherto I have not obtained it. The only other true Pigeon of these parts is the White-backed, *C. leuconota*, which I got a few days later, further within the hills.

A curious little bird obtained to-day is *Ixulus flavicollis*. There was a small flock of them in a dwarf bamboo clump in Capt. H.'s garden, dodging about, and difficult to shoot, from their intense restlessness. It would seem to be more common farther to the east than with us. Its manners and customs are those of the Titmice. I kept a pair for more than a year in an aviary at Kussowlie, and they used to nibble at a bit of hard-boiled egg held up to them, and drive away Bulbuls and other birds of twice their size and fighting weight.

A Titlark, which I made out *Anthus arboreus*, is common hereabouts. I saw no other species at this elevation, but found another which Capt. T. pronounced to be *A. Richardi* at 4000 ft. I got a large Wren Warbler, *Suya criniger*, in some thick hedging in the garden, and in the same situation a little *Phylloscopus* whose christian name I know not to this day, and it agrees with none of Blyth's descriptions. But the best bird I got to-day was a solitary Himalayan Jenny Wren, *Troglodytes Nipalensis*, which very closely resembles the British bird, if it be not indeed identical. It was dodging about a broken-down wall behind the house. I never got above three or four others during many years of collecting.

Capt. H. advised me to be on the look-out for Flying Squirrels on the outskirts of the forest; but I came across none here, nor did the brave Gomez, although I believe he never went fifty paces from the house to look for them. However, I got several of them farther on during this excursion. This species, *Pteromys inornatus*, is at times, as I can testify, far from uncommon. A friend brought me, one winter night, six specimens of this beautiful creature, which he had shot one after another on some trees by the road-side at Landour. By his account there must have been quite a *flight* of them. His attention was attracted by the falling of acorn-cups and small twigs from the oaks overhead. On looking up he saw one, then another, and another among the branches. As his house was close by, he went for his gun, and the result was this unprecedented bag. It was in December, with a fine bit of noon. I have always myself found this species in

pairs, and rather shy. I never succeeded in keeping a Flying Squirrel for any length of time, even when brought to me half-grown. I have done my best to rear them, but they all pined away. The adults are savage and untameable, and bite viciously with their chisel-formed incisors. A still handsomer kind, magniloquently christened *P. magnificus*, belongs to the S.E. Himalayas, and I once, some years afterwards got a single individual of the grey kind, *P. fimbriatus*, on the Tyne range beyond Landour. This specimen I gave to the Calcutta Museum. Oosrao was out all day with one of Capt. H.'s men, and they brought in a Cheer Pheasant, three brace of Kalij, and a Kakur, or Barking Deer, shot close to the house. It was in very poor condition, and a tight ligature was found on one of its fore legs, evidently the fragment of a snare the creature had been caught in; so shooting it was a mercy. It was a doe, without horns. This was the only Kakur obtained hereabouts, as it avoids the pine-forests; but delights in tangled undergrowth, oak, or dwarf bamboo, jungle, and densely-wooded hill-sides. It is of universal distribution at moderate elevations, mostly found at about 4000 to 5000 ft.

(To be continued.)

NOTES AND QUERIES.

Davis Lectures, 1886.—A series of lectures upon zoological subjects will be given in the Lecture Room in the Zoological Society's Gardens, Regent's Park, on Thursdays at 5 p.m., commencing June 3rd, as follows:—June 3rd, "Pigs and their Allies," by Prof. Flower, LL.D., F.R.S.; June 10th, "The study of Zoology," by Dr. St. George Mivart, F.R.S.; June 17th, "Scorpions," by Prof. E. R. Lankester, F.R.S.; June 24th, "Beavers," by Mr. J. E. Harting, F.L.S.; July 1st, "Some of the ways in which Animals breathe," by Prof. F. Jeffrey Bell, M.A.; July 8th, "Eyes," by Mr. F. E. Beddard, M.A.; July 15th, "Swifts and Swallows," by Mr. P. L. Sclater, F.R.S. These lectures will be free to Fellows of the Society and their friends, and to other visitors to the Gardens.

MAMMALIA.

Destruction of Wild Animals in India.—During the year 1885 wild beasts and snakes were unusually destructive to human life in the Central Provinces of India, there having been an increase of 262 in the number of

persons killed as compared with the preceding year. Of wild beasts, tigers, of course, were the most destructive, their victims numbering 110, against 98 in 1884, while the number of tigers killed was only 221, against 260. The deaths from snake-bite last year amounted to 1066, against 797 in 1884, while only 1997 snakes were killed, as compared with 2378. In an official note on the subject it is observed that there has been a "satisfactory increase" in the number of wild animals destroyed; but this increase is due to the larger number of bears, wolves, and hyenas killed.

BIRDS.

Pheasant, Partridge, and Wild Duck laying in the same Nest.—A few weeks ago a nest was found near here containing eggs of the Pheasant, Partridge, and Wild Duck. The fact of birds of such very different nature laying in the same nest seems worth mentioning. The eggs were eventually forsaken by all three species.—E. W. H. Blagg (Cheadle, Staffordshire).

How the Spotted Flycatcher subsists in hard weather. — The severe weather during the second week of May caused considerable mortality among Swallows hereabouts. The observations on the subject (pp. 248, 249) are partially applicable to what occurred in this locality. But the Spotted Flycatcher, which is fairly plentiful here, did not come off quite so badly. I do not think its numbers have been lessened; but it was evidently hard pressed. On May 13th, after nearly forty-eight hours of incessant rain and cold wind, I observed one of these birds—so often associated with romantic situations—perched on the rim of a paraffin barrel. Its wings were drooping, and it seemed to be in a pitiable condition. It stuck to its post all the afternoon. Looking to it frequently, I found that it descended to the ground several times, and occasionally picked up something. Once I saw it pounce on an earthworm, which it devoured. If the fact of this bird feeding on a common earthworm is worth recording, will you kindly insert this note?—J. E. Palmer (Lyons Mills, Straffan, Co. Kildare).

[This little bird, so far as our observation goes, feeds almost entirely on winged insects and spiders. It must rarely happen that it is driven to take worms of any kind.—Ed.]

Curious Nesting-place of a Pied Wagtail.—On asking a man who was with sheep on turnips if he had seen any nests, he replied that he had found a nest there the previous day on the ground, and that the bird had laid one egg in it that morning. I went with him to look at it, and was much surprised to find that it was the nest of a Pied Wagtail. There was a scratching in the ground, and in this the nest was placed close to the bulb of a turnip. The birds were running about close by, and there was

nothing to hide the nest, which was quite out on a flat open field; many nests of this species have come under my notice, but not one in so curious a position.—J. WHITAKER (Rainworth Lodge, Notts).

Ornithological Notes from Mayo and Sligo.—Notwithstanding the cold and late spring, the arrival of summer birds was not so much later than usual, but the harsh north-east winds kept them very silent for some days after their first appearance, especially the Chiffchaff, Willow Wren, and Whitethroat. I have frequently observed these birds flitting about the hedgerows perfectly silent as to song, but occasionally uttering their call-notes; and this season a Whitethroat attracted my attention by its harsh alarm-note three days before I heard one singing. The Sandwich Terns were the first of our summer visitors to put in an appearance on the 25th of March; two or three pairs were at first seen and heard, and were followed by the main flock a few days afterwards. The Chiffchaff was seen on April 1st, but I only heard its song once or twice that day; the bird appeared very much affected by the cold, flitting about the hedge very silently with its feathers ruffled up, and altogether looking very uncomfortable. On the 11th my friend Mr. E. Knox, of Palmerstown, saw Wheatears near Killala, and a Swallow on the 17th, though the latter bird did not appear in this neighbourhood until the 24th, and, as usual, an old male was the first to visit the nesting-place. I heard the Willow Wren on April 24th, the Cuckoo on the 27th, and Whimbrels were very noisy on the 28th. Common Terns were seen and heard on the 30th; and I heard the Whitethroat and Landrail at Killanly on May 5th. Swifts appeared on the evening of the 9th, and a solitary Spotted Flycatcher on the 13th, a day so bitterly cold that the little bird had to keep at the lee-side of a hedge for shelter, occasionally flying to the grass to pick up insects, being unable to stay on the trees, its usual haunt. Of all our summer visitors to this district, the Whimbrels are the most regular in the date of their arrival, for the record of the past nine years' observations show that their cry has been heard about here between April 28th and May 1st. Now, on the contrary, the Sandwich Terns are the most irregular, for I have noted dates of their arrival ranging from March 20th to April 30th. May 7th, being calm and bright, tempted me to launch my punt, and paddle round the estuary down the Moyne Channel to Killala Pool, in order to ascertain which of our winter visitors had delayed their departure to the northern breeding-grounds. On my way down I saw, on the Moyne Sands, a flock of about fifty Bar-tailed Godwits, and, although for a considerable time I watched them attentively through a good field-glass, I was unable to discover any bird exhibiting the red breast of the breeding plumage, all being in the grey winter garb. I also saw three Grey Plovers and about twenty Knots, all in the grey plumage, though in one of the latter birds (shot) two or three red feathers were just appearing between the grey of the

breast. Further down the channel nearer to Killala I saw about a dozen Sanderlings, all in the grey dress, and between thirty and forty Turnstones, several of which were assuming the breeding plumage, and one that I shot had very nearly attained the perfect summer dress. I also observed a large flock of Dunlins, the greater part of which were showing the black breasts and rusty-coloured backs of summer. When I reached Killala Pool a splendid pair of Great Northern Divers were fishing about it; one was in the winter plumage, but the other appeared to be in the full summer dress, the white ring round its neck appearing quite perfect, and, although I was anxious to obtain the bird for a friend's collection, I was unable to get within shot, it was so watchful. While paddling about trying to get a shot at the Diver, several Grey Seals came within half a shot of the punt, Moyne Channel, as far as Killala Pool, being a favourite haunt of Seals, especially during summer, where a small herd regularly haunt a sand-bank, where they congregate at low tide to rest and bask in the sunshine. One day some years ago I counted between twenty-five and thirty Seals, large and small, lying on that bank, but since then they have decreased in numbers, and seventeen is the greatest number I have seen assembled there of late years. On returning from Moyne past Bartragh to the eastern side of the estuary, near Scurmore ice-house, I observed a second pair of Great Northern Divers, which, as well as I could make out with my glass, were in the breeding plumage; and a little further on, near Moyview, three Red-throated Divers appeared, two displaying the red throats and plumage of summer. Cuckoos have been unusually numerous about here this season, while Whitethroats have been scarcer than usual.—Robert Warren (Moyview, Ballina).

Notes from North Yorkshire.—In consequence, I suppose, of the cold and backward season many birds seem to be laying less than the usual complement of eggs. I have noted, amongst others, a Robin, Snipe, and Hedgesparrow, each sitting on three eggs; a Chaffinch and two Brown Owls, each sitting on two eggs. On April 30th some Green Sandpipers called here on migration. I am convinced this species breeds in some of the more secluded districts in this county. How else can we account for their regular appearance in spring, and their return towards autumn (invariably the second week in August) accompanied by their young? Were they breeding in another country they would hardly migrate N.W. up this river in spring *en route* to their breeding-grounds. Stock Doves are increasing in number, and seem to find a scarcity of suitable breeding-holes. My brother and I have already found three nests placed in the forks of ivy-covered trees in such a position as a Wood Pigeon chooses. Another nest in a bank side, two feet from the ground, in an open ploughed field. We found a Waterhen's egg in a hole in a dead tree eight feet from

the ground. There was no nest, but the old bird was sitting on the egg when we found it. The tree overhangs a small pond, which is in no way subject to inundations; but former eggs have been so often taken by farm-labourers, I suppose the old bird tried to find a safer place. On May 8th we found a Cuckoo's egg in a Pied Wagtail's nest, which had contained four eggs previously, but the Cuckoo had evidently turned them all out when depositing her own. This, doubtless, caused the Wagtail to forsake, at least she never sat again on the nest. For several years we have found the same type of Cuckoo's egg in a Pied Wagtail's nest in the immediate neighbourhood of the above-mentioned nest. A Chaffinch laid two eggs in a nest in an apple tree, but for some reason the birds became dissatisfied with the site, and, pulling the nest to pieces, built another with the old materials in a tree about fifteen yards distant. We watched them flying from one tree to another when changing quarters. The eggs, it may be presumed, were allowed to fall; they certainly were not transported. It is, of course, possible that it was another pair of birds which built the second nest. A pair of Blackbirds built a nest in the bottom of a fence. Some one found it, and, lifting up the top half with the lining, laid it by the side of the more solid under structure, formed of mud and roots. In this remaining half the eggs have been laid, and the bird is sitting on them. Fieldfares were here on May 8th. As I write (May 12th, noon) the thermometer stands at 38° F., and snow is falling heavily on the moors. The migrants seem to feel the cold very much, the Swallows being especially feeble, and perching in the willow bushes by the river in such a listless way that they could be knocked down with a short stick.—Thomas Carter (Burton House, Masham).

Grey Hen and Partridge laying in the same Nest.—On June 3rd I found a Grey Hen sitting on her nest, containing eight of her own eggs and six Partridge eggs. It may interest some of your readers to know this.—James Sargent (New Cumnoch, Ayrshire).

Albino Robin.—A friend of mine, Mr. Peckover, has lately shot an albino Robin, which is now being preserved. It was quite young, its tail being only about half an inch long; of a cream colour, with pink eyes.—Kenneth Lawson (12, Harley Street, Cavendish Square, W.).

Breeding of the Lesser Redpoll.—In your extended review of the 'Birds of Cumberland,' you represent me as writing that "the Twite and Lesser Redpoll are charasteristic moorland species." If you will refer to the paragraph on the latter species (p. 47) you will find that it is stated to be most strongly established in the north of the county from the Solway "to Brampton, at the base of the east fells." It is certainly quite the reverse of a "moorland" species, at least in my experience. It is true

that it occurs in moorland regions, such as Skye; but there one only finds it in juxtaposition to a cultivated or sylvan area. The following notes on the Lesser Redpoll may be useful to county faunists:—*Middlesex.*—One or two pairs usually nest in Highgate Cemetery, where my friend Mr. Vine took a clutch of eggs in 1884. *Surrey.*—A young bird was caught near Guildford on August 1st, 1885, and submitted to me for examination. *Devon.*—In July, 1879, Mr. Sladen and I observed an old bird feeding a nestling, on the branch of an ash, near Lynton. The fact of the Lesser Redpoll breeding irregularly in the southern counties is familiar to most of us, but records are scanty, and might well be increased by the readers of 'The Zoologist.'—H. A. Macpherson (3, Kensington Gardens Square, W.).

The Speed of Swallows.—An experiment to test the speed of the Swallow's flight has just been made at Pavia. Two hen birds were taken from their broods, carried to Milan, and there released at a given hour Both made their way back to their nests in thirteen minutes, which gave their rate of speed at 87½ miles an hour.

Wild Duck and Pheasant laying in same Nest.—A curious instance of two birds of very dissimilar habits laying in the same nest has just occurred here, *i. e.*, the Wild Duck (*Anas boscas*) and the Pheasant. About the middle of May I was told of a Wild Duck's nest containing thirteen eggs. On going to look at it some days afterwards I found the nest empty, the young ducks being hatched and gone. The egg-shells, however, were lying round the nest, and among these were two Pheasant's eggs, each containing a fully-developed chick, which would probably have come out in the course of another day. As the period of incubation of the Wild Duck is much longer than that of the Pheasant, these eggs must have been deposited in the duck's nest some time after she had begun to sit.—G. H. Caton Haigh (Aber-iâ, Penrhyn-Dendraeth, Merioneth).

[What is the precise period of incubation in each case? We are under the impression that it is about twenty-eight days in the Duck, and about twenty-one days in the Pheasant. It would be interesting to have a list of species showing the period of incubation, when it varies to any remarkable extent.—Ed.]

Habits of the Coot.—Apropos of the note on this subject (p. 247), I may remark that on the evening of May 30th a Coot, which had her bulky nest in an exposed position in a thin tuft of bullrushes some twenty yards from the bank of the Reservoir, was cruising about in the vicinity of her home, when a Wild Duck swam up into what I suppose the Coot considered her private water, for she resented the intrusion, and, with lowered head and erected feathers, bore down upon the trespasser. The latter retreated, but, not contented with this, *Fulica*, putting on all sail, gave chase, and,

gaining steadily, pressed the duck so hardly that she was forced to rise on the wing to escape. Later, about 8 p.m., I observed the Coot sitting placidly on her raft, and, although I appeared in the open on the bank, she would not abandon her eggs to the evening mists then rising.—Oliver V. Aplin (Great Bourton, Oxon).

Swallows dying of Cold.—On May 15th, at the edge of a field of young corn on one side of Clattercutt Reservoir, I picked up the fresh remains of two Swallows (partly eaten by some animal or bird), and one House Martin. I happened to see them as I walked along, and made no search for others, although possibly there were many more out of sight. Like the birds mentioned by Mr. Nelson (p. 250), the Martin was in good condition, and had evidently been dead only a few hours; indeed, it was so fresh that I made a skin of it. Rain fell heavily on the 11th, 12th, 13th, and 14th, and we had large floods in the valley, the weather being very cold; wind N.N.E. The 15th was stormy, with cold N.W. wind and hail-storms. Besides hundreds of Swallows and House Martins, numbers of Sand Martins hawked over the water, far from any nesting-haunt, where in an ordinary season they should have been at this time of year, a most unusual circumstance.—Oliver V. Aplin (Great Bourton, Oxon).

Ornithological Notes from South Cumberland.—Although the vegetation has been backward in the district, most of the migrants arrived about the usual dates. Swallows and House Martins I first noticed on April 24th, and Corncrakes on the 25th. The Cuckoo arrived on 27th: this is about the date on which the bird is invariably heard here. The Willow Warbler I did not observe till early in May, and the Creeper about the same time. On April 29th many Sandpipers were seen along the Duddon Estuary; these on the following days were dispersing up neighbouring becks. Most of the early-laying birds have nested late this spring. On April 24th I found a Missel Thrush's nest containing two fresh eggs, and on the 25th a Blackbird's; in the following week I saw other Blackbirds' and Song Thrushes' nests containing newly-laid eggs. On May 5th a Ray's Wagtail's eggs were found, and on 6th a friend discovered, on the Fells, a Curlew's nest and a Snipe's, both having fresh eggs. On 6th I saw the first Stone- and Whinchats, and one Wheatear. Up to the date of leaving the neighbourhood (May 12th) I neither saw nor heard the Nightjar, although they frequent the district in small numbers. On the Duddon Sands were many Sheldrakes: these birds breed in the estuary; they were much tamer than during the winter months, and allowed us to approach within gun-shot, although we were accompanied by a noisy colley. On May 7th we found, by watching the parent birds, some young Peewits, a day or so old; they were most amusing, running quickly for some distance, and then squeezing themselves into the foot-prints that the cows had made

in the soft ground on the brink of the runner. When thus hidden they remained motionless, and were most hard to discern. Now and then they uttered a squeak, but the cry was so ventriloquial that frequently we thought we had stepped on one, when it was in reality some little distance away. The old birds meanwhile hovered over us, and apparently directed the movements of the young ones by their cries. The young were most beautifully marked, displaying a tiny crest, and having a conspicuous white ring round the neck. Corn Crakes have been for some years on the decrease, but this season they arrived in unusually large numbers. During the winter many Kingfishers haunted the runners leading to the estuary. An unwonted number of Long-eared Owls fell victims to local guns. A Ring Ouzel was shown me that had been trapped in the lowlands; although they breed on the Fells, they are so scarce in the cultivated parts that the local birdstuffer was unable to name the specimen. There is a great scarcity of Wrens, probably owing to the excessive cold of the winter. Greenfinches, on the other hand, are extremely numerous. In the early spring several pairs of Woodcock bred in the neighbourhood. A keeper a short time ago observed a bird with young. She was conveying them across a stream, and carried them one by one, tucking up her legs so as to hold the little one securely against her breast.—T. N. Postlethwaite (Hallthwaites, Millom).

Ornithological Notes from Oxfordshire.—Several young Black-headed Gulls came up the Cherwell Valley about the middle of July; in addition to the one shot on the 11th (Zool. 1885, p. 349), two were seen at Franklin's Knob on the 28th, one of which was shot, and brought to my brother. Two more were shot in the first week in August at Upton and near King's Sutton. On August 1st I saw one Common and three Green Sandpipers at the Reservoir. Wild Ducks had a good breeding season there; I counted a hundred birds on the open water on the 9th; Teal again bred there, as they did last year. On the 14th a Green Sandpiper, a young bird in moult, was shot on the Cherwell, and brought to my brother. A young Long-eared Owl, which I examined at the birdstuffer's, was shot in Worton Wood on the 15th; it still retained a good deal of down on the back of the head and nape, and was undoubtedly bred there; as a breeding species it is rare in North Oxon. The bulk of the Swifts left on or about the 17th, but I saw two stragglers as late as Sept. 5th at Bloxham Grove. Mr. Darbey, of Oxford, wrote me word that a Manx Shearwater was captured at Stratton Audley about the end of August or beginning of September. About that time also he received two Common Terns, which had been shot on Port Meadow. Although occurring much earlier in the year, I may here mention that a pair of Ringed Plovers were observed on the banks of the Thames, near Standlake, on May 5th; the male was shot and taken to my informant, Mr. W. H. Warner. A considerable number

of Quails visited us this year (1885). On Sept. 2nd we flushed two from standing barley at Bloxham Grove, which in the falling rain were let off in mistake for "squeakers," but on the 5th one of them got up again in the same field, and was shot; it was a male, probably of the year before, as, while possessing the semicircular dark lines on the sides of the face, it wanted the black patch on the throat. On the 4th, Robert Walton, who was formerly a keeper in Ireland and Nottinghamshire, and knew the bird well, told me that two rose at his feet that morning from some cut barley at Adderbury, and he put up six of them the next day; these strayed into standing oats in an adjacent field, and were then flushed, and one at least killed a day or two afterwards. On the 11th I bought two young birds, which had been killed the day before at Sibford Gower, and two more, a young bird and an old one, were hanging in the game-dealer's shop on the 14th; these were shot in the neighbourhood of Hook Norton, where five more were procured later in the season. About Chipping Norton Quails seem to have been very numerous (*vide* 'Ibis,' 1886, p. 101). In the south of the county, Mr. Darbey informs me (*in lit.* Sept. 21st.), that he and a friend shot two at Cowley on the 2nd; he had also received one from Burford, and had heard of others in the neighbourhood. Mr. W. H. Warner wrote me word (Oct. 28th) that a friend of his met with a "bevy" of seven in "Edward's Field," Standlake, and shot three or four of them in September. In that part of the county the Quail appears to be a tolerably regular visitor, Mr. Warner hearing its note every year at Standlake; but here in the north, and probably in most parts of the county, it is extremely irregular in its appearance, and in the numbers which arrive. I hear that it is fifteen years at least since we had any number, and about that date a birdstuffer preserved four examples. On Sept. 9th a Black Tern, a young bird of the year, was shot on the canal some miles above Banbury. On the 11th a young Hobby was procured in Wickham Park; it was one of three birds said to have frequented the place for some weeks, so probably a brood was reared there. A female Nightjar, not at all a common bird here, was shot at Sibford on the 14th. Mr. Darbey tells me that on the 17th he received from Headington a nearly white Yellowhammer, and he had also in his shop a Berkshire example of the Greenfinch, "just the colour of a pale canary." On the 27th, among a party of nineteen black and white Wagtails, I detected two adults of *Motacilla alba*. The party included also old male Pied Wagtails, still carrying black backs; females of the same; partly moulted young (of *M. Yarrellii*), exhibiting a narrow line of black on the sides of the breast round the bend of the wing; and unmoulted grey birds. A young Barn Owl with down still adhering was brought to the stuffers on the 28th. On the 29th there were very large flocks of Peewits in the Cherwell Meadows; one lot extending in a long double line must have numbered from twelve to fifteen hundred birds. On Oct. 10th I saw

an immature Shoveller on Clattercutt Reservoir. A Spotted Crake was shot on the Cherwell on the 19th, a rather late date for its occurrence here. The Pochard had arrived at the Reservoir by Nov. 7th, and I observed what appeared to be a female Garganey accompanying nine Teal, than which it was slightly larger, colder and greyer in colour, and with more contrasted tints. One of two Jack Snipes picked up together under the telegraph-wires on the 18th weighed full three ounces. On the 21st the Tufted Duck had returned. Two large hawks, probably Buzzards, passed over on Dec. 5th, flying rather high, and proceeding in a succession of circles. On the 25th I counted over fifty Pochards and four Tufted Ducks on the Reservoir, and a flock of fifty or sixty Golden Plovers appearing in the valley a few days later, foretold the severe weather we were to experience at the beginning of the new year.—Oliver V. Aplin (Great Bourton, Oxon).

SCIENTIFIC SOCIETIES.

Zoological Society of London.

June 1.—Dr. A. Günther, F.R.S., Vice-President, in the chair.

The Secretary read a report on the additions that had been made to the Society's Menagerie during the month of May, 1886, and called attention to an Orange-thighed Falcon (*Falco fusco-cærulescens*), presented by Capt. W. M. F. Castle, R.N., stated to have been obtained in Chili; and to five Senegal Parrots (*Pœcephalus senegalus*), presented by R. B. Sheridan, Esq., four of which had been bred in this country.

Dr. A. Günther exhibited and made remarks on a specimen of a small fish of the genus *Fierasfer* embedded in a pearl-oyster.

The Secretary made some remarks on the most interesting objects he had observed during a recent visit to the Zoological Gardens of Rotterdam, Amsterdam, Cologne, Antwerp, and Ghent.

A letter was read from Mr. J. M. Cornely, of Tours, stating that his pair of Michie's Deer had bred in his park, and that a young one had been born on May 15th.

Mr. Beddard read notes on the convoluted trachea of a Curassow (*Nothocrax urumutum*), and on the form of the syrinx in certain Storks.

Mr. W. F. Kirby read a paper containing an account of a small collection of Dragonflies which had been formed by Major J. W. Yerbury at Murree and Campbellpore, N.W. India. The collection contained examples of about twenty species.—P. L. Sclater, *Secretary*.

ENTOMOLOGICAL SOCIETY OF LONDON.

June 2, 1886.—R. M'LACHLAN, Esq., F.R.S., President, in the chair.

The following gentlemen were elected Fellows of the Society, *viz.*:—Messrs. C. Baron-Clarke, M.A., F.R.S., H. Wallis-Kew, W. Dannatt, J. P. Mutch, B. W. Neave, A. C. F. Morgan, and Wm. Warren.

The President announced that Mr. F. E. Robinson, a Fellow of the Society, and formerly a pupil of Prof. Westwood, had been killed by a tiger in India on April 27th last.

Mr. Stevens exhibited a specimen of *Heydenia auromaculata* (Frey.), from the Shetlands, a species new to Britain.

Dr. Sharp exhibited a number of specimens of *Staphylinidæ*, prepared by him some years ago with a view to their special protection and permanent preservation. The insects were placed in cells of cardboard, and these were covered above, or above and below, with cardboard, the whole being hermetically sealed by applications of successive layers of bleached shellac. The President said the plan appeared to be very successful where the cardboard cells were left open on both sides, but when the cell was complete below only one surface of the insect could be examined.

Mr. Billups exhibited *Meteorus luridus* (Ruthe), a species of Ichneumonidæ new to Britain, obtained by Mr. Bignell.

Mr. W. White, in exhibiting cocoons of *Cerura vinula*, called attention to the vexed question as to how the perfect insect escapes from these solid structures. He was inclined to think that formic acid, secreted by the insect, was a probable factor in the operation. The question as to the mode of escape from these cocoons of the parasitic Ichneumonidæ and Diptera was also raised; and the President, Baron Osten-Sacken, Mr. Waterhouse, and Prof. Meldola made remarks on the subject.

Mr. Elisha exhibited living larvæ of *Geometra smaragdaria* from the Essex marshes. He also exhibited the singular pupæ of *A. Bennettii*.

Mr. Howard Vaughan exhibited a series of several hundred bred specimens of *Peronea hastiana*, showing the innumerable varieties of the species. He also exhibited, on behalf of Mr. Sidney Webb, of Dover, an interesting series of *Cidaria suffumata*, with especial regard to the progeny of particular females, the parent and the produce of the eggs laid by her being carefully separated. Mr. Vaughan also read notes on the subject communicated by Mr. Webb; and Mr. Jenner Weir, Mr. Waterhouse, Mr. Distant, Dr. Sharp, and Mr. Stainton took part in the discussion that ensued.

Mr. A. G. Butler communicated a paper on "New Genera and Species of Lepidoptera-Heterocera from the Australian Region," in which 21 new genera and 103 new species were described.

Mr. J. S. Baly communicated a paper on "Uncharacterized Species of *Diabrotica*."—HERBERT GOSS, *Secretary*.